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PROCESS FOR THE TRANSMISSION OF TELEVISION  
SIGNALS AND SYSTEM FOR IMPLEMENTATION OF PROCESS  
[Verfahren zur Übertragung von Fernsehsignalen  
und System zur Durchführung des Verfahrens]

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## Claims

1. Process for the transmission of television signals where a telecast is transmitted at least partly in digital form,

characterized in that a local central unit switches the data selection circuits over as a result of at least two successive responses of the television viewer and as a result of the centrally transmitted digital processing program for parts of the telecast.

2. Process according to Claim 1, characterized in that in the television studio, a program is assembled with information surplus for drops and with a processing program for the local central units.

3. Process according to Claim 1, characterized in that /2 the centrally transmitted digital processing program is controlled in memories of the controlling central units in the television cable networks and in the memory of the local central units from television receivers with direct reception.

4. Process according to Claim 1, characterized in that output data of the individual television viewer are put into the memory of the local central unit.

5. Process according to Claim 1, characterized in that the television viewer's responses are put into the memory of the local central unit.

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<sup>1</sup>Numbers in the margin indicate pagination in foreign text.

6. Process according to Claim 1, characterized in that the centrally transmitted identification data of the individual fragments of a telecast are put into the memory of a local central unit.

7. Process according to Claim 1, characterized in that the output signals of the local central unit turn on and turn off the sound signals of at least one sound channel with corresponding information that in each case is demanded by the individual television viewer.

8. Process according to Claim 1, characterized in that the individual additional sound information items are directed in the television receiver in the infrared band to the individual infrared receivers, in which -- depending on the viewer's response -- a selection is made of the information, and selected information is passed on to the infrared receiver that is arranged next to the earphone on the head of the particular television viewer.

9. Process according to Claim 1, characterized in that /3 the output signals of the local central unit switch over the reception from mobile images to the reception of alphanumeric and graphic symbols and vice versa.

10. Process according to Claim 1, characterized in that the output signals of the local central unit switch over the selection circuits for the identification data of the individual fragments of the telecast.

11. Process according to Claim 1, characterized in that the output signals of the local central unit switch the television

channels over.

12. Process according to Claim 1, characterized in that the output signals of the local central unit turn the information of the local source on.

13. Process according to Claim 1, characterized in that the output signals of the local central unit turn on the recording of the necessary information items for the local information source.

14. Process according to Claim 1, characterized in that the output signals of the local central unit turn on the recording of the selected information item on the local printer.

15. Process according to Claim 1, characterized in that the output signals of the local central unit in the viewfinder of the local camera put in the contours of the shape that was blended into the centrally transmitted image, whereby as a result of the in-blending, one obtains a telecast with the participation of an actor who, during the particular telecast, remains at home under the direction of the director from the television studio.

16. Process according to Claim 1, characterized in that /4 the television viewer's response is put into the memory of the local central unit of the television receiver with direct reception and is put out parallel and is converted into telephone signals that consist of a first signal in the form of the code of the new telephone service performance for the transmission of the television viewer's answers, similar to the known code of conference links, and a second signal as response, where the transmission of these signals takes place via the subscriber

telephone line to the memory of the local central unit at the telephone exchange, regardless of whether the particular subscriber telephone line is free or is occupied by a telephone connection.

17. Process according to Claim 1, characterized in that the television viewer's answers are multiplexed from a residential building block and are supplied via a subscriber telephone line to the local memory of the central unit in the telephone exchange.

18. Process according to Claim 1, characterized in that the answers from viewers, who are connected neither to a television cable network nor to the telephone network, are recorded on magnetic cards but are suitable for transmittal by mail to the memory of the central units.

19. Process according to Claim 1, characterized in that the answers of the viewers -- obtained both in the memories of the local central units in the television cable networks and in the memories of the local central units in the telephone exchanges -- are counted and are transmitted in the form of statistical data to the television studio and are used there for the correction of the transmitted telecast and the next program from the series. /5

20. Arrangement for the implementation of the process according to at least one of the above claims with devices for the transmission of at least a part of the information in digital form, characterized in that on the receiver side, an input of the local central unit (6) is connected with the circuit for the

input of answers from the television viewer (2) and a second input is connected with the circuit (3) for putting in the centrally transmitted digital processing program and that the output of the central unit is connected with a data selection circuit (8).

21. Arrangement according to Claim 20, characterized in that a circuit (35) for putting in initial data from the television viewers is connected to the input of the central unit (6).

22. Arrangement according to Claim 20, characterized in that a circuit (34) for the input of answers from the television viewers is connected to the input of the central unit (6).

23. Arrangement according to Claim 20, characterized in that a circuit (40) for the preliminary screening of the identification data is connected to the input of the central unit (6).

24. Arrangement according to Claim 20, characterized in that the circuit (43) for turning the sound signal on is connected to the output of the central unit (6).

25. Arrangement according to Claim 20, characterized in /6 that the central unit (6) is connected to an infrared receiver (16) and a circuit (20) -- connected to the infrared receiver (16) -- for turning the sound signals on.

26. Arrangement according to Claim 20, characterized in that the output of the central unit (6) is connected to the multiplex circuit (45).

27. Arrangement according to Claim 20, characterized in that the output of the central unit (6) is connected to a data selection circuit (41).

28. Arrangement according to Claim 20, characterized in that the output of the central unit (6) is connected to the circuit (27) for the switchover of the television channels so as to select the corresponding fragment of the telecast.

29. Arrangement according to Claim 20, characterized in that the output of the central unit (6) is connected to the local information source (50).

30. Arrangement according to Claim 20, characterized in that the output of the central unit (6) is connected to the multiplex circuit in the viewfinder of a camera (51).

31. Arrangement according to Claim 20, characterized in that the circuit (34) for putting in the answers of a television viewer via a control circuit (32) is connected with a prefix generator (29), a subscriber call number generator (30) and a circuit (31) to generate the television viewer's answer, whose signals [the circuit's signals] are multiplexed and are put into the subscriber telephone line.

32. Arrangement according to Claim 20, characterized in that circuit (34) for putting in the answers of a television viewer is connected with a recording instrument (33), in which the television viewer's answer is recorded on a magnetic card. /2

33. Arrangement according to Claim 20, characterized in that the central units in the television cable networks and the



telephone exchanges are connected to a central central unit or a central processor, from which the statistical data of the answers of the television viewers are supplied to the monitor in the television studio.

This invention relates to a process for the transmission /8 of television signals, especially for the performance of active television, where reception of specially programmed telecasts is possible.

Known systems with devices for the reception of telecasts and for communication between television viewers and the television studio require the use of a cable network. On the basis of the answers from television viewers, for example, to test questions that are transmitted in the frequency band from 0 to 30 MHz, such a system transmits news -- corresponding to the individual television viewers -- in one of the channels in a frequency band of 30 to 300 MHz. Data transmission is centrally controlled by means of a central unit. Such a system was described by E.B. Carne, G. Aaronson, M. Chaurierre in /9 "Interactive Television in the United States," Sylvania Videon, 1975, No. 20, pages 22-24.

Another known system is based on the local reproduction of a correspondingly programmed telecast from a video disc memory or support, in which, additionally, there is provided a micro-central unit to control the switchover of the tracks from which the information is read. The switchover depends on the television viewer's answer (J.L. Bennion, E.W. Schneider: "Inter-

active Videodisc Systems for Education." Journal of the SMPTE, December 1975, Vol. 84, pages 949-953).

Furthermore, a video text system has been developed by means of which one can reproduce texts and simple illustrations that are to be transmitted centrally on the screen of a television receiver. The system does offer the television viewer the possibility of selecting a corresponding page of a text out of several pages transmitted in succession; but it does not facilitate any communication with the sender (conversation reception of telecast). Changes in the video text transmission system were described by R.T. Russell in "Teletext Decoder Modifications, Wireless World," January 1978, pages 71-72.

The object of the invention is to provide processes and a system that will facilitate mass reception of dialogue television programs, where the television viewers can answer "yes," "no," or by making a selection from a number of predetermined alternatives and where they can attach to these answers corresponding individual supplementary information, explanations and other data.

This problem is solved according to the invention by /10  
by the object of the main claim. Other embodiments will emerge  
from the subclaims.

Changes must be made on the transmission and reception side  
§ of the system to solve the above problem. On the transmission  
side, special telecasts are processed with a great effort in  
terms of labor; they have a data surplus for drops, together with  
a digital processing program for the individual data fragments  
provided in the telecast. These telecasts are transmitted to a  
large number of viewers, for example, by means of space stations,  
amplifying television stations and by means of local cable  
12 television systems with a central unit control.

13 According to the invention, a local central unit is provided  
in the home television receivers on the receiver side; that  
central unit switches the data selection systems on the basis of  
the television viewer's answer and on the basis of the centrally  
transmitted digital processing program for the television  
18 segments (transmission fragments).

Telecasts that are transmitted to the largest number of  
television viewers -- for example, sports and entertainment  
programs, in other words, programs that are viewed mostly in a  
single television receiver by more than one person -- according  
to the invention are additional information items in the form of  
additional sound signals that in analogy to the known signals of  
foreign-language translations are transmitted in sound channels  
that are provided in addition to the video channel or that are

transmitted in radio channels. On the receiver side, according  
2 to the invention, the individual variants of the additional  
information are passed on in the form of acoustic or sound  
signals in the television receiver in the infrared band to the  
individual infrared receivers that are arranged in the known  
6 infrared transmission equipment for remote control of television  
receivers. In these transmission units, the keyboard is used  
additionally for the introduction of the answers from the  
television viewer and the central unit -- for example, made /11  
as integrated microprocessor and working as remote control signal  
coder -- on the basis of the digital processing program during  
corresponding time intervals turns on the information items  
corresponding to the particular television viewer, and these  
information items are once again passed on in the infrared band  
to the infrared receiver arranged next to the headphones.

16 Additional information in the form of alphanumeric or graphic  
signals are less used in such telecasts, specifically only in an  
area where the attention of other persons using the same  
19 television receiver will not be diverted excessively.

Telecasts for a smaller group of viewers -- such as didactic  
21 and popular-science programs -- have additional information items  
both in the form of sound signals and in the form of video  
signals. For this purpose, the signals of the local central  
unit\* switch over to the reception of alphanumeric and graphic  
25 signals and so do the identification data selection circuits for

\* from reception of mobile images

the individual parts (fragments) of the telecast. The television channels are also switched over when the individual fragments of a telecast can be transmitted in more than one television channel. Besides, the output signals of the central unit switch over the reception and reproduction of information in the local information source.

Another feature of the system, according to the invention, consists in the participation of the television viewer in the centrally transmitted telecast in such a way that the output signals of the local central unit in the viewfinder of the television camera turn on the contours\* of the persons as provided for by the director. The shape of the viewer contained in these contours is blended into the main content.

In the case of telecasts where an answer or the opinion of the television viewers is desired in marketing, in commercial orders, in some didactic programs, television quiz events, the viewer's answer is put into the memory of the local central unit, or it is put out parallel and converted into telephone signals, that is to say, into a special signal -- the code of the new service in prefix form, similar to the known code of conference links -- and the signal of the subscriber call number and the answer of the subscriber. These signals are introduced into the subscriber telephone line regardless of whether this line is currently free or whether it is occupied by a telephone connection; an exception here consists of the short time span of call

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\* image segments

signal transmission (transmission of dialing signal), in which the answer is delayed. These answers are supplied to the monitor in the television studio after statistical processing.

Preferred embodiments of the invention will be explained in greater detail below with the help of the drawing.

Figure 1 is a block diagram of reception devices of a television system that works at least partially in a digital manner.

Figure 2 is a block diagram of a system that is altered as compared to Figure 1 with a receiver for additional information items in the form of sound signals, if more than one person happens to be viewing a telecast on one television receiver.

Figure 3 is a block diagram showing a television reception /13 system with a text decoder for the reception of digital data.

17 Figure 4 is a block diagram showing a circuit that transmits the  
18 answers from a viewer to a memory in the central unit.

Figure 5 shows transmission devices for infrared rays for the circuit according to Figure 2.

The block diagram shown in Figure 1 contains a circuit 2 to put in answers from a television viewer and a circuit 3 to put in a digital processing program. Besides, there is provided a circuit 4 for the preliminary screening of the information items for the television viewer as well as a control circuit 5. A central unit or a processor 6, for example, an integrated

microprocessor, supplies the digital processing program, the answers of the television viewer and the following identification data of the individual parts or fragments of a telecast into a memory 7 (RAM). The output signals of the central unit 6 control a data selection circuit 8. Besides, provision is made for a circuit 9 to pass on the answers of a television viewer to a memory -- not shown in Figure 1 -- of an external central unit, that is to say, an external processor. A circuit 10 is used to convert video signals and for image illumination. The number 11 labels a circuit for sound signal restitution.

The block diagram shown in Figure 2 contains the central unit 6 that energizes a sound signal switching unit 20 in at least one additional sound channel.

The number 12 refers to a keyboard and 16 is an infrared /14 transmitter. The reference symbol 13 indicates a remote-control signal (output of infrared transmitter 13). Digital data are supplied to an infrared receiver 16. The digital data produced by the infrared transmitter are labeled 17, while the reference symbol 18 indicates at least one sound channel. A command 19 represents a command for a sound signal of a corresponding channel that is supplied to a circuit 20 for turning on the selected sound channel. The number 21 indicates an infrared transmission unit that reproduces a sound signal in the infrared range with a selected additional information item. The circuit illustrated in Figure 2 constitutes a transmission unit for remote control and is labeled 23, where block 24 indicated at the

bottom of Figure 2 is a retransmission circuit for sound transmission when turning on the selected sound signal for a time that is determined by the central unit 6.

According to the circuit shown in Figure 3, a central unit 6 with input and output circuits and with a memory is connected to a television receiver 54 with at least one additional sound channel and to a video text decoder 56 with an additional data output (hamming decoder). Central unit 6 controls the turn-on or switch-on of the additional sound signals and the turn-on of the additional or exchanged fragments of the video signal content or the video image content. The supplied video signal is labeled 25. The number 26 refers to a control circuit and number 27 indicates the line for switching over television channels for preliminary screening of the corresponding fragments of a telecast. A circuit 34 is used for remote input of answers from a television viewer and a circuit 35 serves to put in initial data from the television viewers. A circuitry block 36 causes the preliminary screening of the digital data of the video signal. The number 37 refers to a printer. Besides, a /15 multiplexer circuit 38 is provided. Central unit 6 has input circuits 39 that are connected to a circuit 40 for the pre-screening of digital processing programs and the identification data of the individual transmission fragments with the input circuits 39. A circuit 41 constitutes a data selection circuit or a circuit for the comparison of the addresses of text information, for example, page numbers. Local central unit 6



switches over the data selection circuits 41 as a result of the answers from a television viewer and the digital processing programs which are supplied to the central unit 39 by the output circuit. When the addresses are the same, then the subsequently put-in data are supplied to an RAM memory 44. The number 42 refers to a generator for alphanumeric and graphic symbols and 43 is a circuit for switch-on or for the operation of additional sound channels of a television receiver 54 which, as mentioned before, has at least one additional sound channel. Besides, a multiplexer circuit 45 is associated with receiver 54.

The text decoder labeled 56 furthermore contains a circuit 47 for prefiltering or prescreening of the symbols for the control of image illumination and an output circuit 48 for symbols. The number 49 indicates the output circuit of the central unit 6. Block 50 forms a local information source, for example, a disc memory or the like to store video signals. A multiplexer circuit 51 in the viewfinder of a television camera is used to project the graphic symbols into the image of receiver 54 of the television camera that furthermore is connected to a receiver 52 for a remote-control signal. Remote-control signal receiver 52 furthermore sends signals 53 for the control of the television receiver 54 to the latter. Receiver 54 finally contains an output signal 55 for video signals. A circuit 57 /16 in decoder 56 is used for the prefiltering of control signals or control commands (for example, do not illuminate!)

In the following, reference will be made to the block diagram in Figure 4. In this circuit, the responses from the viewer are converted into telephone signals with a multifrequency code and are transmitted in terms of time, one after the other, via a telephone line if the telephone subscriber does not dial a call number of another television subscriber. The circuit shown in Figure 4 contains a control circuit 32 that is provided with a prefix generator 29 for a transmission announcement of the television viewer's answer with a subscriber call number generator 30 and with a circuit 31 to generate the television viewer's answer. The number 34 designates the circuit for the remote input of the answers from a television viewer that is connected to circuits 31 and 32. The number 28 designates the control signal for the delay of the answer, which represents the short span of time during which call signal transmission takes place, and during that time span, the answer is delayed. The multiplexer is labeled 38 and supplies a signal for the subscriber telephone

18 line <sup>46</sup>~~38~~.

Figure 5 shows a diagram of the receiver system indicating the viewer who, together with other viewers, watches a program in the receiver unit 54. The viewer hears the sound signal that is transmitted in a first sound channel and, at corresponding time intervals, he gets additional information in the form of sound via headphones 64 and -- during the reception of the additional information -- there is either quiet in the first sound channel, or the voices in the other two channels differ essential from

each other, for example, a male voice and a female voice. /17  
Then such information can -- due to the division of attention --  
be acquired in analogy to comments made by persons living in  
houses, a teacher reciting a lesson in school or the like. A  
photoelement labeled 63 is locked with respect to an infrared  
source 60, or it is correspondingly masked, whereas it is ready  
to receive for an infrared source 62. The number 58 designates a  
unit that contains the remote-control transmitter 23 and the  
sound retransmitter 24. The number <sup>59</sup>~~55~~ designates infrared rays  
for the transmission of remote-control signals as well as signals  
according to the answers from a television viewer; these signals  
correspond to answers that are put in via device 34. The  
infrared rays labeled 60 are used to transmit signals of at least  
one additional sound channel with additional information. A  
photoelement 61 receives signal 60 in the form of sound. The  
number 62 refers to the infrared rays for the transmission of the  
sound signals with corresponding variation of the additional  
information. Photoelement 63 receives sound signals 62. The  
number 64 indicates the headphones for the viewer.

20     The process described and the system for the performance of  
the process facilitate interactive television and mass use; this  
facilitates active entertainment, teaching, marketing, opinion  
gathering, television quiz events and discussions with television  
24     viewers.

In the process according to the invention, the data  
selection circuit is switched over by the local central unit due

to at least two successive answers from a television viewer and as a result of a centrally transmitted digital processing program for the fragments or segments of a telecast.

On the receiver side, the system contains a local central/18 unit 6, whose one input is connected to a circuit 2 for putting in answers from the television viewer and whose second input is connected to a circuit for the introduction of the digital processing program for parts of the telecast, which is labeled 8.

Reference is made expressly to the circuit connections of the individual blocks in Figures 1 to 4 as regards the rest of the structure of the system according to the invention.

#### List of References

/19

1. The video signal.
2. The circuit for the introduction of the television viewer's answers.
3. The circuit for the introduction of the digital handling program (telesoftware).
4. The circuit for the prescreening of information items for television viewers.
5. The control circuit.
6. The central unit (the processor, for example, integrated microprocessor).
7. The memory (RAM).
8. The data selection circuit.
9. The circuit for forwarding the answers of the television viewer to the memory of the external central unit.

10. The circuit for video signal conversion and image illumination.
11. The circuit for sound signal restitution.
12. The keyboard.
13. The infrared transmitter.
14. The remote-control signal.
15. The digital data and the phonics with the different variants of additional information.
16. The infrared receiver.
17. The digital data.
18. At least one sound channel.
19. The command for sound turn-on in the corresponding channel.
20. The circuit for turning on the selected sound channel.
21. The infrared transmitter.
22. The sound signal in the infrared and with selected additional information.
23. The remote-control transmitter.
24. The retransmission circuit for sound transfer with turn-on of selected sound channel for the time determined by central unit (6).
25. The videosignal. /20
26. The control circuit.
27. The switchover of the television channels for the prescreening of the corresponding fragments of a telecast [sic.]
28. The short time of call signal transmission during which the answer is delayed.

29. The prefix generator for transmission announcements of the television viewer's answer.
30. The subscriber call number generator.
31. The circuit for the generation of the television viewer's answer.
32. The control circuit.
33. The registration unit for the recording of the television viewer's answer on a magnetic card.
34. The circuit for the remote introduction of the television viewer's answers.
35. The circuit for the introduction of the initial data of the television viewers.
36. The circuit for the prescreening of the digital data from the video signal.
37. The printer.
38. The multiplexer circuit.
39. The input circuits of the central unit.
- 18 40. The circuit for the prescreening of the digital handling program (telesoftware) and the identification data of the individual fragments of the telecast.
41. The data selection circuit or the circuit for the comparison of the addresses of teletext information items, for example, page numbers; the local central unit (6) switches the data selection circuits on the basis of the answers from the television viewer and the digital handling program (telesoftware), which is performed by the output circuit of the

central unit (49) [sic]; when these addresses are the same,  
the data arriving thereafter are introduced into the memory  
(44) [sic].

42. The generator of the alphanumeric and graphic symbols.
43. The circuit for turning on one of the additional sound channels in the television receiver (54).
44. The memory (RAM).
45. The multiplexer circuit.
46. The signal output for the subscriber telephone line.
47. The circuit for the prescreening of the symbols for the /21 control of the image illumination function.
48. The output circuit for symbols.
49. The output circuit of the central unit.
50. The local information source such as, for example, video disc device.
51. The multiplexer circuit in the viewfinder of the television camera for the application of the graphic symbols on the image.
52. The receiver of the remote-control signals.
53. The signals for the adjustment of the television receiver.
54. The television receiver with at least one additional sound channel.
55. The output circuit for the video signals.
56. The teletext decoder with the additional data output after the hamming decoder.

57. The circuit for the prescreening of the control symbols, for example, a command: do not illuminate.
58. The device made up of the remote-control transmitter (23) and the sound retransmission circuit (24).
59. The infrared rays for the transmission of the remote-control signals and the signals of the answers from the television viewer (34).
60. The infrared rays for the transmission of the signals of at least one additional sound channel with additional information.
61. The photoelement for the reception of the sound signals (60).
62. The infrared rays for the transmission of the sound signals with a selected variant of additional information items.
63. The photoelement for the reception of the sound signals (62) for the infrared rays (60) masked [sic].
64. The headphones (for the bone system of the ear).



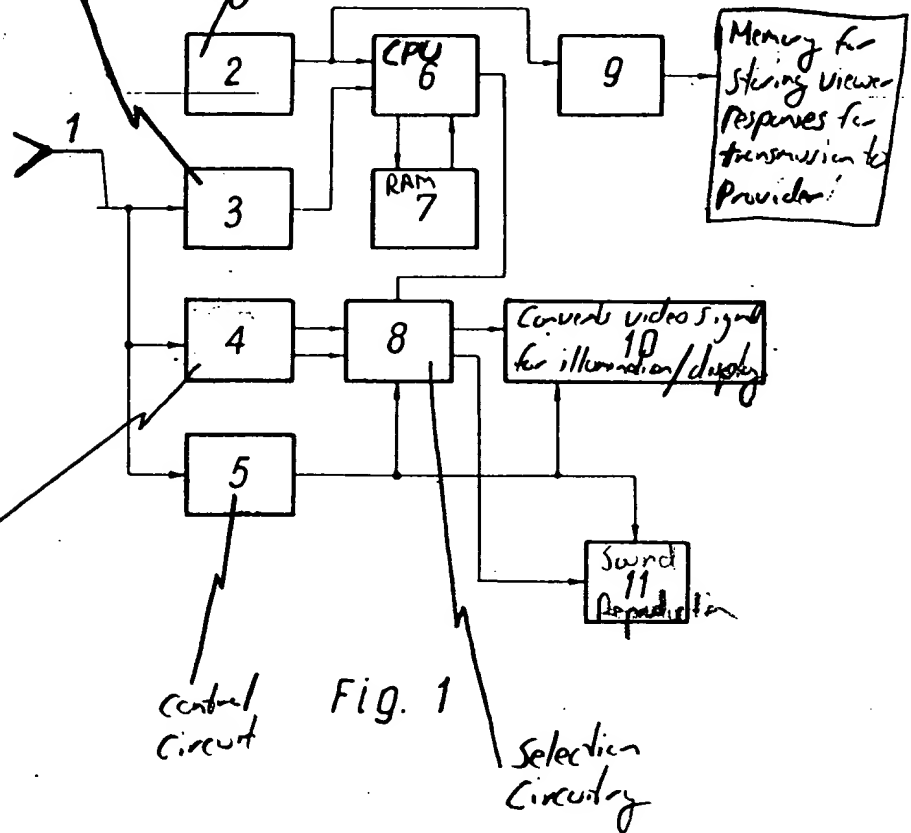
2904981

Extracts the Telesoftware/Digital Programming Data from the received TV signal

Input Device for receiving responses from Viewers

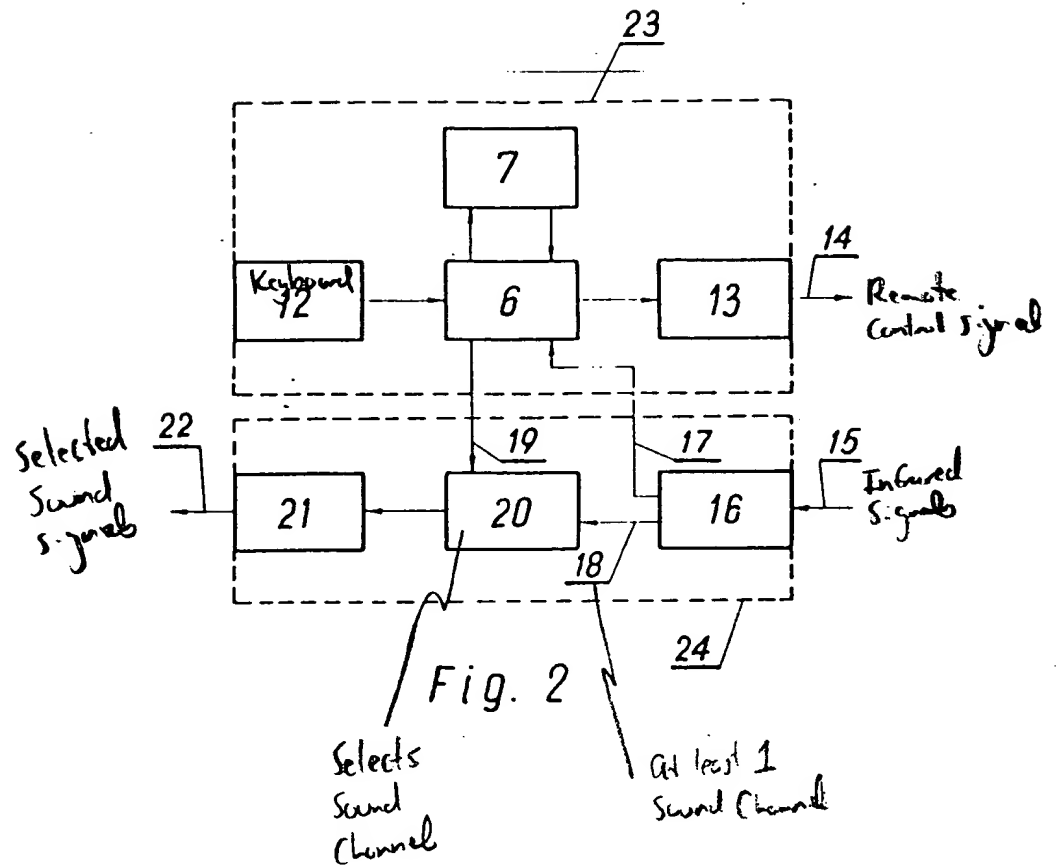
Broadcasted TV signals which are embedded with teletext data & "Telesoftware" [ie computer programming data]

Preliminary Screening of Viewer information



909833/0761

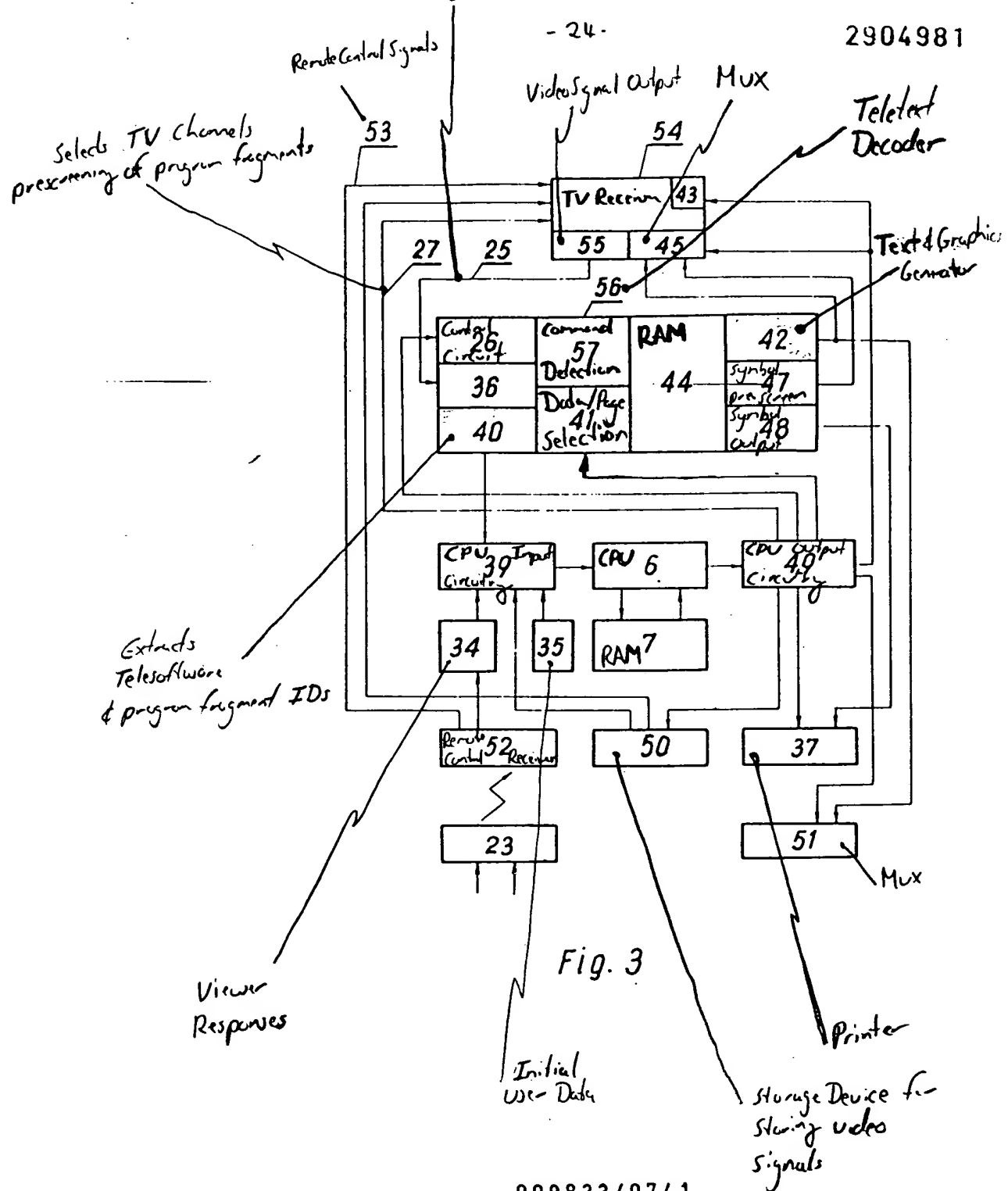
⊗ Shown & Described in detail via figure 3



Broadcast TV Signal w/ embedded Teletext & Teletext software

- 24 -

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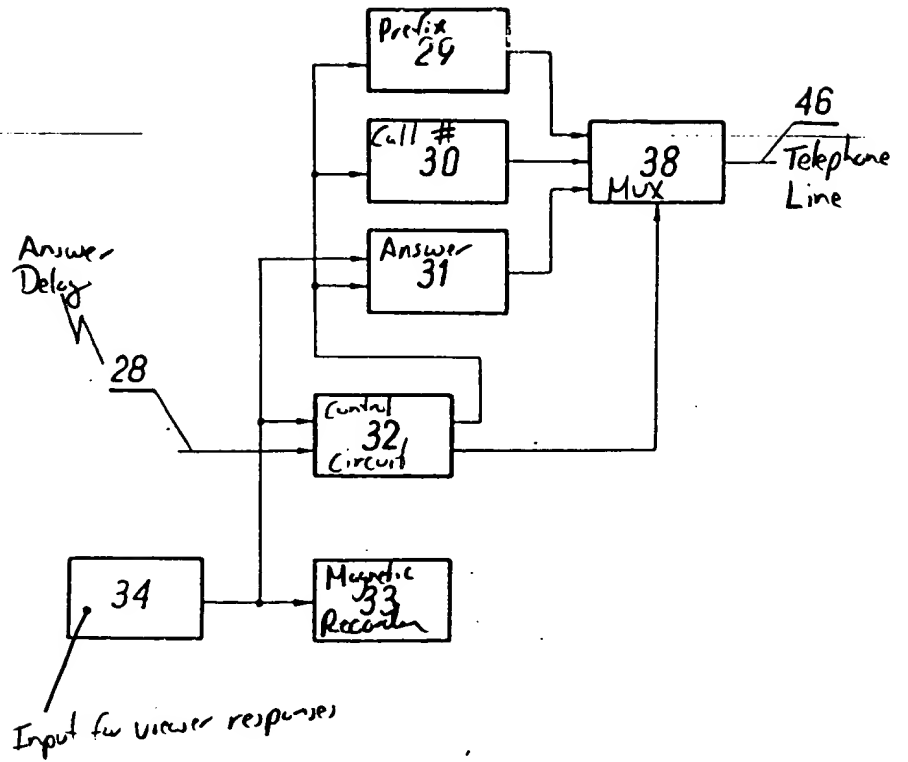
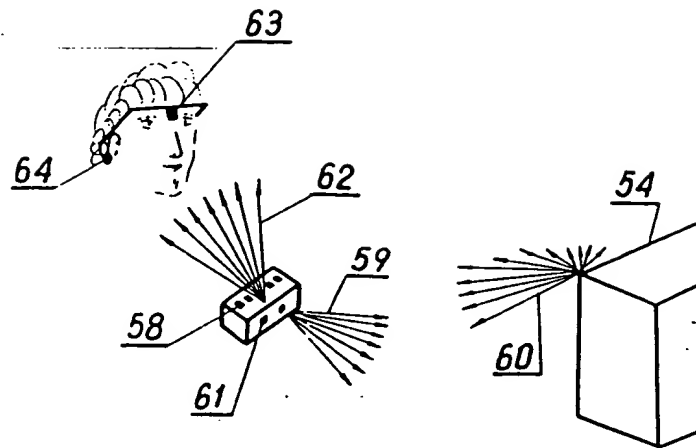


Fig. 4



*Fig. 5*